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SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE •

NOVEMBER 24, 1934

Nobelist in Chemistry, 1934

See Page 323

A SCIENCE SERVICE PUBLICATION

SCIENCE NEWS LETTER

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The Weekly Summary of Current Science

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SCIENCE SERVICE

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Edited by WATSON DAVIS

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DO YOU KNOW?

The electric eel can apparently regulate the power of the current it releases.

Making men's neckties of leather is a new branch of the leather industry in this country.

Gladiolus plants grown outdoors for cut flowers can be forced by heating the soil with electricity.

An African fish called *Pantodon buchholtzi* eats practically nothing but living cockroaches.

Plans are being made to establish a Spanish-American University at San Diego, California.

In the time of Charles the First of England, a health ruling forbade cellars being used as lodgings.

Government chemists have developed a fast new method for preparing extracted honey for market.

Southern California has a queer health problem: exterminating rats that take shelter in palm trees.

Canada's highest peak, Mount Waddington popularly called Mount Mystery, has never yet been climbed.

Cherries and apricots especially suitable for North Dakota conditions are being developed at the State Agricultural College.

A bronze statuette of Hercules recently found by a peasant in Boeotia is pronounced a masterpiece of Greek art of about 490 B.C.

Of the four great cities of the Roman Empire—Rome, Constantinople, Alexandria, and Antioch—only Antioch can be excavated on an extensive scale.

The flat and battered look of the nose on the Egyptian Sphinx is attributed to the cannonading of Napoleon's soldiers at the Battle of the Pyramids.

Whether a snake bite will have serious results depends not only on the amount of venom injected, but on the victim's natural degree of susceptibility, and whether the venom is injected directly into a vein or artery or not.

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These curiosity arousing questions show at a glance the wide field of scientific activity from which this week's news comes. Book references in italic type are not sources of information for the article, but the references for further reading. Books cited can be supplied by Book Department, Science News Letter at Publishers' prices, postpaid in the United States.

CHEMISTRY

Nobel Chemistry Award For Discovery of Deuterium

Young Physical Chemist, Working With Two Youthful Colleagues, Brings to America Second Science Honor

See Front Cover

THE 1934 Nobel Prize in chemistry was awarded to Prof. Harold C. Urey of Columbia University in recognition of his part in the discovery of heavy hydrogen (deuterium). Since the 1934 physics prize and the 1933 chemistry prize unawarded last year are not to be given this year, all of this year's science Nobel awards are to be conferred on Americans. The prize in medicine went to the Americans who developed liver therapy for pernicious anemia, Drs. G. H. Whipple, George R. Minot and William P. Murphy.

Prof. Urey is only 41 years of age and he is professor of physical chemistry at Columbia. He discovered heavy hydrogen in 1931, in collaboration with Dr. F. G. Brickwedde of the National Bureau of Standards and Dr. G. M. Murphy of Columbia University.

Research on the heavy isotope of hydrogen and its compound with oxygen, heavy water, has filled the journals of chemistry and physics. So much research has been under way, and so fast have new discoveries been made, that the National Research Council recently formed a committee to serve as a clearing house for research information in this field. Prof. Urey is chairman of this committee.

Early this year Prof. Urey was awarded the Willard Gibbs medal, another high scientific honor.

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CHEMISTRY

Heavy Hydrogen's Great Use Is Tracing Atoms

By DR. HAROLD C. UREY, Nobelist in Chemistry, 1934

THE importance of heavy hydrogen, or deuterium, to chemistry lies in the fact that it enables scientists to trace the course of chemical reactions, and also enables them to check theoretical calculations on chemical reactions, particularly as they deal with the effects of the mass of atoms.

To physics, deuterium is important because it provides physicists with a new atomic nucleus for use in experiments on the bombardment of the atom, in which some of the secrets of atom nuclei can be learned.

Since living things live essentially in a water solution, and all—man, animal and plant—are composed so largely of hydrogen compounds, deuterium is, of course, very important to the biologists.

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GENERAL SCIENCE

We Nominate— For Future Halls of Fame

THIS being the time of year when Nobel prizes are being awarded, the temptation to list notable science achievements of the past few years is too great to resist.

We nominate for future halls of fame:

The discovery of heavy hydrogen or deuterium, by Dr. Harold C. Urey of Columbia University, Dr. F. G. Brickwedde of the National Bureau of Standards, and Dr. G. M. Murphy of Columbia University now honored by the Nobel prize in chemistry for 1934.

The discovery of artificial radioactivity by Prof. F. Joliot and Irene Curie-Joliot, Parisian husband and wife research team.

The discovery of the positron or positive electron by Dr. Carl D. Anderson of California Institute of Technology.

The discovery of the neutron by Dr. J. Chadwick of Cambridge.

The development by Dr. William P. Murphy of Boston and Dr. Guy W. Clark of Lederle Laboratories of a potent liver extract, one injection of which monthly will control pernicious anemia.

The award of the 1934 Nobel prize in medicine for liver therapy for this disease to Dr. George H. Whipple of Rochester, N. Y., Drs. George R. Minot and William P. Murphy of Boston.

The successful transplantation of parathyroid and thyroid gland tissue by Drs. Harvey B. Stone, J. C. Owings and George O. Gey of Johns Hopkins.

The exploration of those bearers of heredity, the genes, within the chromosomes, an epic of biological research in which a half-dozen scientists in America and abroad have participated.

The demonstration by Dr. Leonard

DR. F. G. BRICKWEDDE

DR. G. M. MURPHY

G. Rowntree of Philadelphia that the hormone of the mysterious thymus gland visits precocity on future generations.

The development of improved television apparatus, iconoscope and kinescope, by Dr. V. K. Zworykin of Camden, N. J.

The application of the experience of automotive and aeronautical engineering to railroading, resulting in the development of high speed trains of a new mechanical breed.

The adding of 75 miles per hour (60 per cent.) to the speed of transport airplanes without requiring additional power, which came largely as the result of application of National Advisory Committee for Aeronautics research on engine location, cowling and wing sections.

The aluminizing of astronomical mirrors, replacing silvering, with the result that shorter wavelengths of light from the heavens can be caught and studied.

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CHEMISTRY

Hydrogen's Heavy Twin Has Already Had Romantic Life

By WATSON DAVIS

Extracts from Chapter 7 on Heavy Hydrogen in "The Advance of Science" (Doubleday, Doran)

IF IT WERE discovered that some substantial citizen of the world was actually twins and one of these twins was twice the weight of the other although they had passed for each other to all who knew them, there would be created in everyday life a situation such as confronted the chemists and physicists when in 1931 the twin nature of hydrogen was discovered. For hydrogen is one of the most substantial of chemical elements, more important perhaps than any other except carbon.

The discovery of a heavy kind of hydrogen, about twice the weight of ordinary hydrogen, has stirred scientists to a high pitch of intellectual excitement. It is more important than any of the recent isolations or discoveries of new chemical elements. It is even now ranked "among the great discoveries of science." It is the starting point in developing a far-reaching new field in chemistry.

Discovering Deuterium

Deuterium, as the heavy hydrogen has been christened, has started a fever in the chemical laboratories of the world. It has reoriented research programs, sidetracked less promising researches, and caused a rush to print that has filled the announcement columns of the chemical and physical journals. Whereas water was just water a few months ago, there is now heavy water, distinctly different from ordinary water. And there are actually nine chemical kinds of water. Biologists have joined in the race, to discover the effect of deuterium in heavy water upon living things.

"Urey, Brickwedde, and Murphy" is the way in which the scientific literature cites the research team that discovered heavy hydrogen. They are three young scientists, who were 38, 28, and 26 years old in 1931 when they acted as obstetricians to hydrogen's fission.

Predicted by Theory

Prof. Urey himself had speculated on the existence of double-weight hydrogen (and also triple-weight hydrogen and quintuple helium) after he had compared the proton and electrons in the kernels of the elements lighter than oxygen and had come to the conclusion that there was a place for more than one kind of hydrogen in the scheme of elemental things. By one of the coincidences that happen in science as elsewhere, Prof. Herrick L. Johnston of Ohio State University came to the same conclusion, and his predictive paper was printed by the side of Urey's in the same number of the *Journal of the American Chemical Society*. (*August*, 1931)

Acting upon Birge and Menzel's suggestion that there might be in ordinary hydrogen gas one part of hydrogen isotope 2 to 4,500 parts of mass one hydrogen atoms, Urey, Brickwedde and Murphy decided that the best way of concentrating the heavy isotope would be to take a quantity of ordinary hydrogen gas, liquefy it, and then evaporate all but a few drops of it. The heavy hydrogen would remain mostly in the last few drops. These drops were sealed into glass bulbs by Brickwedde in Washington and sent to Urey and Murphy in New York.

The spectrograph, that useful analyzer of the rainbow of light emitted by the intense activity of the atoms, was called into service. The little ampule of hydrogen gas, in which the experimenters confidently hoped they would find heavy hydrogen, was subjected to electrical discharge. In the way the light was emitted Urey and Murphy found telltale spectral "flags" which proved the existence of heavy hydrogen.

The Race for Heavy Water

With the existence of deuterium conclusively demonstrated, there was the great urge to get it isolated in such purity as to see whether it was markedly different from ordinary hydrogen. Dr. E. W. Washburn, chief of the U. S. Bureau of Standards, division of chemistry, who died early in 1934 in the midst of intensive research on deuterium, suggested and put into practice the method of separating deuterium by electrolysis. In the industrial plants that make oxygen and hydrogen gases by breaking up water with an electric current, Dr. Washburn found the first step in electrolytic separation already accomplished. The water in commercial electrolytic cells that have been operated for long periods was markedly richer in the heavier deuterium than ordinary tap water. The lighter kind of hydrogen had a tendency to go off as gas first when the water was broken up into its hydrogen and oxygen by the electricity. Further electrolysis of the water rich in deuterium gave what was, up to that time, the world's heaviest water.

Costlier Than Gold

Just what these figures, that differ markedly from the standard values accepted for water, mean, will be realized when it is remembered that water is the substance widely used in setting the standard values for freezing point, boiling point, and other physical constants.

Like any rare substance, the cost of heavy water was at first high. About the middle of 1933, 95 per cent. heavy water was valued at $150 a gram, $150,000 a quart. Early in 1934, Princeton University scientists produced it at an estimated cost of $5 a gram. With methods already developed, it can probably be produced in quantity at from $1 to $2 per gram, a figure that is higher than the 1934 price of gold. Compared with its early production costs of one-

time chemical rarities, like neon, argon, helium, and even aluminum, the cost of heavy water is not excessive.

Now a Third Hydrogen?

While heavy hydrogen was being explored thoroughly, the search for "heavy, heavy hydrogen," or a mass three isotope, proceeded. There is growing evidence that triple hydrogen does exist, although there is probably not more than one part in ten billion parts of normal hydrogen. Lord Rutherford found evidence of the formation of triple hydrogen in bombardments involving double hydrogen. The extreme scarcity of triple weight hydrogen will probably prevent its isolation or its chemical utilization.

If the existence of mass three hydrogen is conclusively proved, the number of chemical compounds in the universe is prodigiously increased. Take water, for instance. With three kinds of hydrogen and three kinds of oxygen, there can be eighteen kinds of water. When the thousands of compounds containing hydrogen are considered, the complexity becomes bewildering.

Naming the Baby

Just as parents have the privilege of naming their children, discoverers have the right of christening new chemical babies. It was rather awkward to continue referring to "hydrogen isotope of mass two" when the infant was so lusty and needed so much writing about in scientific journals. "Heavy hydrogen," for precise scientific literature, was unsatisfactory because of the mass three hydrogen isotope. So Drs. Urey, Brickwedde, and Murphy held a scientific christening and dubbed the new heavyweight hydrogen "deuterium." To the more common mass one isotope they gave the special name of "protium," so that the old term of hydrogen might be applied to both and specifically reserved for the mixtures of the protium and deuterium which before deuterium's discovery were the only hydrogen known. Because the nucleus of the deuterium atom was useful as a particle in atomic studies, it needed a special name. "Deuton," corresponding to "proton," the long accepted name for the ordinary hydrogen atomic nucleus, was selected by Dr. Gilbert N. Lewis of the University of California who first obtained almost complete separation of the isotopes.

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ASTRONOMY

Mysterious "Great Red Spot" Of Jupiter is Explained

Island of Solid Ammonia Floating on An Ocean of Liquid Hydrocarbons Suggested as Its Structure

A GREAT island or berg of solid frozen ammonia floating on a sea of liquid hydrocarbons like ethane, ethylene and acetylene, is suggested as the structure of the long-known, mysterious "great red spot" observed on the surface of the planet Jupiter. The hydrocarbon ocean may be as large as the planet itself, which is 34,800 miles in diameter.

This astounding postulate is presented by Dr. Arthur Adel of the University of Michigan and Dr. V. M. Slipher of Lowell Observatory (*Physical Review, Nov.* 15) in describing research which provides indications of the nature of the atmosphere on the major planets: Jupiter, Saturn, Neptune and Uranus.

The largest constituents of the "air" of these distant planets of the solar system is methane, each molecule of which is composed of an atom of carbon and four atoms of hydrogen. Ammonia has previously been detected on Jupiter and Saturn.

The ammonia island suggested by Drs. Adel and Slipher could be created by the extremely low temperatures of the distant planets because they are so far removed from the source of the earth's and their own heat—the sun. Of the major plants, Jupiter is nearest to the sun, but is still 483,300,000 miles away, over five times as far removed as the earth. Neptune, most distant of all major planets, is 2,791,600,000 miles away from the sun.

Freezing Hydrocarbons

The presence of methane in the atmosphere of the large planets indicates the temperature is not lower than 265 degrees Fahrenheit below zero, which is the boiling point of methane. Yet this is low enough to freeze and liquefy such gases as ethane, ethylene and acetylene.

A search for other gases, report Drs. Adel and Slipher, "leads to the conclusion that the other hydrocarbons, if they are present at all in the atmospheres of the giant planets, must exist only in traces relative to the amount of methane present. Presumably, these hydrocarbons as well as many others exist below the atmospheres of the giant planets. The unanchored motion of Jupiter's Great Red Spot suggests that it is an island of solid hydrocarbon or ammonia floating in a vast hydrocarbon ocean as extensive as the planet's surface itself."

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BACTERIOLOGY

New-Found Yeast Strain Grows Below Freezing Point

YEAST that will grow at temperatures below freezing point has been discovered growing in cider, by James A. Berry of the frozen pack laboratory of the U. S. Department of Agriculture. (*Science, Oct.* 12). Mr. Berry isolated cells of the new strain of yeast, and grew cultures from them in beer wort at 28 degrees Fahrenheit, 4 degrees below the freezing point of water. Despite its chilly environment, the yeast grew freely.

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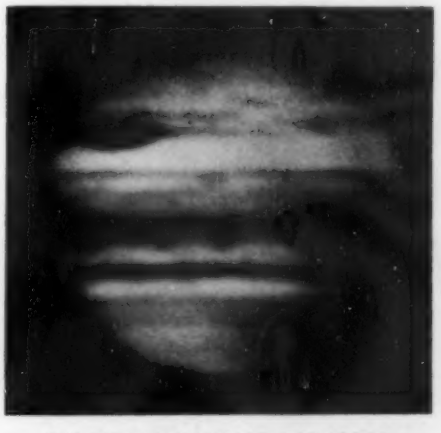
Calabash pipes are really made from calabashes brought from South Africa.



FRIGID FLOATING ISLAND?

Jupiter's great "red spot," showing like a big eye at upper left, may be an enormous mass of solid ammonia.

ZOOLOGY-BOTANY

Turks, Bearing Gifts

Central Europe Received Corn and Pumpkins From Turks, So at First Called Them Turkish Corn, Turkish Cucumbers

By DR. FRANK THONE

WHEN the Thanksgiving turkey has departed into the interior, never to return, you may possibly raise a grateful incense-wreath to his memory from the end of a Turkish cigarette.

Did it ever occur to you to wonder why these two most thoroughly native-American products, turkey and tobacco, should have been thus dedicated to the Turk, who had nothing to do with the discovery of America? And did you ever know that two other prominent parts of the feast, pumpkin and corn, were once also called Turkish?

Such is the case. In 1542, exactly fifty years after the discovery of America, a German botanist named Leonhart Fuchs published what was then the best book on plants in existence. It is still rated as a classic of botany. In this book, which was printed in Latin, as well as in his German translation of it, published the following year, Fuchs included the first printed pictures of pumpkin and corn plants. These pictures he labeled "Turkish cucumber" and "Turkish corn."

In the text he explained the names: "Another species is called Turkish cucumber, doubtless because it came into our country first from Turkey." And some pages further on: "The plant here considered has been brought to us only recently from Turkey, Asia and Greece; therefore it is called Turkish corn. Thus far it has no Latin name other than *Turcicum frumentum.*"

Conqueror's Course

But why should these American products have got into Central Europe by this roundabout way, picking up false names on the road? The reason is easy to understand, when we recall the politico-military situation in Europe at the end of the fifteenth century. In 1453, the Turks had conquered Constantinople, after centuries of fighting. They then rapidly pushed their European holdings up the Danube and over toward the Adriatic, until by the end of the century they could challenge even Venice, then supreme naval power in the eastern Mediterranean.

As a new sea power, they came into contact with the first fruits of the Spanish and Portuguese trans-Atlantic explorations, and soon introduced corn, pumpkin and turkey into the rich agricultural lands that slope toward the Black Sea. Tobacco they planted in what is now Bulgaria, where much of the world's supply of "Turkish" tobacco is still grown. Thus these far-travelled Americans entered the German-speaking lands by the back gate, so to speak, disguised as Turks! Corn and pumpkin have long since regained their birthright, but the poor turkey-bird still has to wear the red fez.

Perverse Misnaming

We may regret the misnaming of the turkey, that noblest American of them all, after a nation that had no part in his discovery, and only served as a middleman for his introduction to the peoples of northwestern Europe. But we must not place any blame, either upon the bird himself or upon his earliest sponsors. They did their best to give him a name of his own, and only the perverse course of linguistic history defeated them.

The first name the turkey bore, after his arrival in Europe, was "fowl of the Indies." Within 25 years after the first voyage of Columbus that name was common in a half-a-dozen western European languages, from England to Italy, according to the early sixteenth-century zoologist, Conrad Gesner, who described and pictured the turkey in his ponderous three-volume natural history set, *Historia Animalium.*

Gesner's artist was not the most skillful in the world, perhaps; yet his drawing of the turkey is entirely recognizable, and not to be mistaken for any other bird. He is all there, from featherless red head and neck to spreading tail. The latter to be sure is shown perhaps a bit short—on the printed page it looks as though the woodcut had threatened to be too wide, and was kept down to the right size at the expense of his tail-feathers.

Gesner, being a learned man, wrote in Latin, the language of learning of his day. He wanted a Latin name for the bird, and supported the suggestion for *Gallopavo,* which, he says, other scholars had put forth previously. But that name itself is a compromise or hybrid, being made of the Latin names for a rooster and a peacock.

The learned zoologist dissented with colleagues who had confused the "India fowl" with the "Guinea fowl," already well known in Europe, and had attempted to call it by the same Greco-Latin name, *Meleagris.* However, his protest proved unavailing, and more than two centuries later the great Swedish naturalist Linnaeus, lawgiver of modern scientific naming, fastened upon the poor bird the title *Meleagris gallopavum*—one name stolen, the other a hybrid of two species to which it is not at all closely related. And the common English name today and apparently forever, turkey, is another wrong guess.

"TURKISH CORN"

Within 50 years after Columbus' voyage, this American plant had been given a false name in Germany.

"TURKISH CUCUMBER"

Like corn, the American pumpkin was for a time needlessly ceded to Turkey. The flatter-shaped pumpkin was called "Sea Cucumber."

Four hundred years and more of honorable endeavor of bearing the White Man's gustatorial burden, and still no proper name of his own. Bitter indeed is the turkey's fate!

Where the pumpkin goes to, on Thanksgiving Day, is not open to any doubt, especially if there are any boys at table. Where the pumpkin came from is still disputed among botanists, many holding that it is strictly American, but some holding for an Asiatic origin.

However that may be, the Indians of North America, especially in Mexico, were in possession of both pumpkins and squashes when the white men came, and they made many and appetizing uses of these stout vegetable cousins.

One rather elaborate method of "fixing" a pumpkin, widely practised in Mexico, is described by Miss Emma Reh, a young American woman who has travelled into many by-roads in the southern republic, studying Mexican life. The Indians, she says, pierce the rind of pumpkin with many symmetrically arranged round holes, after the manner of "plugging" a watermelon. They they boil the whole fruit in honey —the only sweet the Mexicans had before the coming of the Spaniards. Then, when the pumpkin is thoroughly impregnated with sweetness, they fill up the holes with wooden stoppers, and hang up the tempting specimen to sell.

Less elaborately prepared are candied pieces of pumpkin and squash. Sometimes the flesh is given a preliminary treatment with a wood-ash lye solution, to make it firmer. Pumpkin flowers are often boiled and eaten as especially dainty vegetables. Pumpkin seeds, toasted and salted, are the "peanuts" of the Mexican peon.

Even the standard American joke-smith's town of Punkinville has its Aztec equivalent. In the Mixtec region of Oaxaca there is a town called Silacayoápan. Its name is derived from the Aztec word *chilacáyotl,* which means a species of striped pumpkin or squash.

Turkeys still rule the roost in the villages of upland Mexico, as they did in the days of the Spanish conquistadores, 400 years ago. When the soldiers of Cortez first invaded the Aztec empire they found that the subjects of Montezuma had an abundance of domestic plants—corn, beans, peppers, chocolate, pumpkins and squashes—but only one domestic animal, the turkey. After they had taken over the land, the Spaniards introduced European animals which the Mexican natives now use for food; but even so the turkey is still their great standby.

The turkey fits into rural Mexican life intimately, as one who has always been of the family. In Zapotec villages, the final ratification of a marriage is always followed by the "dance of the turkey," in which the bridegroom takes a big gobbler by the wings and dances through the streets with him to the home of his new parents-in-law. Turkeys must have figured in early Mexican ideas of an earthly paradise, for the ancient name of Yucatan means "land of deer and turkey"—"ulumil ceh ulumil cutz."

The Mexican art of cooking a turkey, however, would leave American housewives a little dazed. The specially prized dish is known as turkey molè. Molè is a dark, sweet sauce, and its preparation is a high art, as well as something of a mystery. Into the molè go chocolate, garlic, cinnamon, sugar, chile, tomato, toasted squash seed, tortilla crumbs, and a number of other ingredients, all rubbed to powder on a metate, the archaic Mexican grinding stone.

The turkey is cut into joints and parboiled. Then it is transferred to the simmering sauce and the cooking finished in that. Experienced turkey-molè eaters swear by the dish, and at fiesta times a really skilled molè cook is sought after over wide regions.

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BEAUTIFUL, BELLIGERENT, BELOVED

Mexican villages in the interior have turkeys everywhere, not only the relatives of our fine bronze turkeys but also the white variety prized by many raisers in this country. These two belligerent gobblers were snapped by an American woman in a seldom-visited town in the mountains. Then she had to beat a hasty retreat, for the turkey-gobbler goes to war like a battleship, broadside-on, and these two were rapidly bearing down on her with hostile intent.

GEOGRAPHY

Polar Ice Cap Shivering In Perpetual Vibration

EVEN an ice cap shivers in the wind of a Siberian polar sea. So it appears from the discovery reported by Ibrahim Fakidov, member of the Soviet Arctic expedition on the S. S. Cheliuskin.

M. Fakidov found that the solid ice cap of the Chukchi Sea is in a state of perpetual vibration. Reporting this observation (*Nature, Oct.* 6) the Russian scientist stated that the vibrations are caused mainly by wind. In addition to wind vibrations he also observed "disturbance vibrations" in the ice, spreading equally from the center—the spot of the breaking up of the ice in different directions.

M. Fakidov stated that he planned to set up special ice seismographs on the shore-ice to take observations of both types of vibrations. These data are expected to prove valuable in forecasting ice conditions.

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MEDICINE

Mothers' and Babies' Lives Saved By Prenatal Care

COLD figures that tell the story of how mothers' and babies' lives were saved by care of the mother during the months before the birth of her child were reported by Dr. E. L. Bishop, Tennessee state commissioner of health, and Dr. W. C. Williams, director of Williamson County, Tenn., health department, to the Southern Medical Association.

The figures showed what happened to two groups of mothers in Williamson County. One group, reported to the health department by physicians, were regularly visited by public health nurses who pointed out to them the dangers of childbearing, taught them how to care for themselves, and reported on their condition to the physician in charge. The other group had no supervision or care before childbirth.

The figures showed that the rate of maternal deaths per thousand births was approximately four times as great in the unsupervised as in the supervised group. There were no deaths in the supervised group from preventable causes but the deathrate from such causes in the unsupervised group was over 4 per 1,000 births.

"The supervision of 50 per cent. or more of prenatal cases has been associated with what was believed to be a significant decline in the maternal mortality rate," Dr. Bishop said in reporting results of seven years during which the maternal hygiene program has been in force in Williamson County.

Babies as well as mothers benefitted by the care given to the mothers. In the first place more babies were born alive to mothers in the supervised group.

Discussing the figures which give the mean annual death rate for babies under one year of age, Dr. Bishop pointed out that this rate was two and one-half times higher in the unsupervised group than the supervised group and three times higher in the state at large than in the supervised group. The rate of deaths from infectious and respiratory diseases was six times greater in the non-supervised group than in the supervised group. The death rate for diseases of stomach and digestive organs was twelve times greater in the unsupervised group.

Statistical analysis showed that the cold figures were significantly in favor of the supervised group. These mothers and babies had a distinct advantage over those of the unsupervised group in their fight to survive the hazards of childbirth.

Science News Letter, November 24, 1934

CHEMISTRY

Soviet Chemists Produce Leather From Dolphins

LEATHER from dolphin stomachs is the latest achievement of Soviet chemists.

In their search for new sources of leather and leather substitutes, the chemists have found that dolphins—sea-going mammals and small relatives of the whale—have stomachs that provide suitable material for women's and children's shoes, and various haberdashery articles.

Dolphin leather will be manufactured at the Leather Works in Tagan Rog, Northern Caucasus. The method was worked out at the Azov-Black Sea office of the Leather Trust.

Soviet chemists have been actively working on leather materials, since the second five year plan calls for increased shoe production. One hundred million pairs per year is the goal to be attained, compared with present output of thirty million. Twenty-one new factories are to be constructed for the purpose.

Science News Letter, November 24, 1934

IN SCIENC

PHYSICS

Purest Water Weighs Less Than Kind Man Drinks

"PROTIUM oxide," purest water yet prepared, practically free from "deuterium oxide" which contains the double-weight hydrogen variety, is lighter than the common drinking water by about 12 parts per million. Ordinary water contains about one part in 9000 of heavy water, according to the group of investigators who carried out the extensive purification in connection with the work here described.

E. H. and Prof. C. K. Ingold at University College, London, and H. Whitaker and Prof. R. Whytlaw-Gray at the University of Leeds, purified London and Leeds tap water by fractional distillation, electrolysis and decomposition with metals, until it contained at the most a few units per cent. of the original heavy water.

The discovery of heavy water has involved many changes in the chemist's and physicist's "constants." Even the atomic weights of hydrogen and oxygen, among the most accurately known, need slight alterations. The scientists point out in their communication (*Nature, Oct.* 27) that it is doubtful whether the ratio of the weight of hydrogen to oxygen has ever been determined using gases of normal composition.

Science News Letter, November 24, 1934

ARCHAEOLOGY

Finds 4,000-Year-Old Stone Age Village

THE VILLAGE of some of Sweden's Stone Age hunters and fishermen, 4,000 years old, has been found on the shore of picturesque Valdemar Bay on the southeast coast.

Prof. O. Janse, archaeologist who made the discovery, expects to find other, similar settlements in the region.

Prof. Janse unearthed quantities of fish and animal bones cast aside by the villagers from their meals, and also the pieces of their earthenware vessels.

Science News Letter, November 24, 1934

NCE FIELDS

CHEMISTRY

Weight of Rare Element Determined for First Time

THE FIRST atomic weight determination of protactinium, next to the heaviest element, has been made by Prof. Aristid Von Grosse and M. S. Agruss of the University of Chicago who recently isolated this element for the first time. The value of its atomic weight is 231, with an accuracy of 0.5 per cent.

The 0.1 gram of protactinium oxide recently isolated was used for that purpose. The pure compound potassium protactinium fluoride was prepared and converted into the oxide, using platinum equipment exclusively. The ratio of two molecules was determined by means of a very sensitive ultra-micro-balance. From this ratio the value of the atomic weight was determined.

This atomic weight fixes also the values of all other elements of the actinium radioactive series and is in complete agreement with the result which Prof. F. W. Aston, British authority on actinium lead, obtained with his mass spectrograph.

Science News Letter, November 24, 1934

METEOROLOGY

Drought Threatens Return; Abnormal Frosts in East

DROUGHT again hovers threateningly over a large part of the country, as dry, chill winds in the East and South bring a foretaste of early winter, a survey of mid-November weather by the U. S. Weather Bureau discloses.

While abnormal cold carried frost far down into Georgia, and early snows fell in New England, the West received the not-too-welcome boon of a warm wave, with temperatures from 9 degrees to as much as 14 degrees above normal from the Great Plains westward. Without accompanying rain, warm weather there must be rated as "not-so-good."

But from everywhere have come reports of lack of rain. As yet, actual drought conditions do not prevail except in limited regions, thanks largely to the more-than-generous rains that fell during September. However, there is a noticeable note of anxiety in many of the crop-weather reports.

Winter wheat conditions in the Ohio valley are stated to be "good to excellent," except in the upper valley where in many localities the crop must be reported as poor because of lack of rain. The northern parts of the Corn Belt still have moisture "sufficient for present requirements;" nevertheless "even in these sections good rains would be helpful in most places." The same holds true for the winter wheat areas of eastern Nebraska and Kansas, and southward through Oklahoma, Arkansas and Louisiana.

In the Plains area, from Montana southward, there is a recurrent note of their already four-year-long tragedy of drought; "winter grains are in serious need of moisture, with much plowing and seeding suspended due to dry soil and stands that are generally unsatisfactory or poor."

More cheerful word comes from the Pacific Northwest, where good rains have helped the wheat. And even in the drier Midwest and Southwest the lack of rain has not been an unmixed curse, for the corn and cotton harvests have gone ahead rapidly in the dry fields.

Science News Letter, November 24, 1934

ARCHAEOLOGY

"Cities" of Maya Land Different From Today's

IF YOU have a mental picture of Mayan Indians living in crowded streets in beautiful stone "cities" down in Yucatan and Guatemala, that picture should be erased.

Dr. Oliver G. Ricketson, Jr., archaeologist of the Carnegie Institution, is attempting to correct this popular impression that the ancient Mayas congregated in great cities. The rank and file of the Mayan people were always farmers.

"The ruins that we see today," explains Dr. Ricketson, "are the civil and religious centers to which the surrounding farmers flocked on market and feast days."

Out from the hub of such civic centers may be still seen radiating in every direction in the jungle the low house mounds where the farmers had their homes. The population around such a center as Uaxactun, in Guatemala, is estimated at no less than 48,000.

Science News Letter, November 24, 1934

PLANT PATHOLOGY

Boron Causes Leaf Spots That Look Like Disease

BORON, familiar to most of us in its common compound borax, can cause spots that look as though they were caused by disease organisms, states Dr. J. J. Christensen, pathologist of the University of Minnesota. Excess boron in the soil frequently brings them out.

The boron spots, states Dr. Christensen, resemble the common spot blotch disease of barley, making it difficult to diagnose the condition without careful laboratory examination. The spots may be artificially induced by adding either borax or boric acid to the soil in which the plants are growing.

Science News Letter, November 24, 1934

AGRONOMY

Crowded Planting Lowers Corn Quality

CORNSTALKS growing in a field do not like overcrowding any more than men working in a factory do; they respond by inferior individual performance. A measure of this unfavorable effect of crowding has been obtained by Harold F. Eisele, of the biology department of Sioux Falls College, S. D.

In his experiments, Mr. Eisele grew separate plots of corn, one with one stalk to a hill, one with three and one with five. At intervals during the growing season he gathered sample stalks from all the plots, and compared their growth in height, in stem thickness, in leaf area and in total weight of dry substance. In all these measurements, except stalk height, the plants crowded five to a hill were markedly inferior, while the ones that had been given the relative freedom of one stalk to a hill made the best showing.

At the end of the season, the ears were harvested and the grain yield measured. In the crowded stand, about a fourth of the stalks failed to bear any ears at all, and nearly half of the ears that were produced were nubbins. In the one-stalk plot, every stalk produced at least one ear, and many bore two, while the nubbin ears amounted to not much over a tenth of the total. The average length of the ears from the five-stalk stand was a little under six inches, while the stalks from one one-stalk stand averaged nearly two inches longer than that.

Science News Letter, November 24, 1934

ASTRONOMY

Stars of Legend

Dramatis Personae of Famous Story are All Present In the Constellations of the December Skies

By JAMES STOKLEY

MANY are the stories associated with the constellations, stories which date in most cases from remote antiquity. The dramatis personae of one of these famous mythological tales is now entirely with us in the evening sky. It is a story of a princess who was rescued from a horrible death by a great hero. In the constellation of Andromeda we see the heroine of the tale. She was a princess of Ethiopia. Cassiopeia, just to her north, was her mother, the queen. King Cepheus, her father, stands in the northwest, directly below his wife. His constellation is not nearly as conspicuous as the queen's; perhaps this is in accord with their relative importance when, and if, alive!

On the old star maps which, unlike the modern and more scientific charts, showed the mythological figures around the stars, Andromeda is represented as chained by her hands and feet to a huge rock. According to the legend, this was the punishment that was visited upon her because of her mother's boast of being more beautiful than Juno or the sea nymphs. These ladies were so insulted that they appealed to Neptune, god of the sea, for vengeance, and he sent a great sea monster to ravage the Ethiopian coast. This not being sufficient for the blood-thirsty god, he required Cassiopeia to sacrifice her daughter, and so she was chained to the rock to await the monster's pleasure.

Hero to the Rescue

In accordance with the best traditions of fairy tales, however, a hero appeared to rescue her. This was none other than Perseus. Having obtained, with the assistance of Mercury and Minerva, the winged sandals and the helmet of invisibility, he had been able to slay and behead the Medusa. She was one of the three Gorgons, women whose locks consisted of serpents, and who were so terrible to look upon that anyone doing so was turned to stone. Perseus slew her by looking not directly at her, but at her reflection in his shield. As the blood from her body fell upon the ground, Pegasus, the winged horse, sprang from it. According to Ovid, Perseus then mounted Pegasus, and a famous painting by Rubens shows Pegasus and Perseus together with Andromeda. However, there is no classical authority that Pegasus was his steed, and anyhow, he could already fly with the winged sandals. According to the classical story Pegasus was later caught by another hero, Bellerophon, with golden bridle given to him by Athena.

Petrifying Sight

Regardless of his exact form of aerial locomotion, Perseus flew over the coast of Ethiopia, just as the monster was about to devour Andromeda. By waving the Medusa's head before the monster, he turned that creature to stone, and then severed the chains that bound the princess. Of course, he then married her but apparently they did not "live happily ever after," for Perseus later got into other adventures and seems to have left his princess behind.

The constellation of Perseus lies just to the east of Cassiopeia, and may be recognized from a curved row of stars called the "segment of Perseus" that forms the hero's body and upraised arm in which he holds a sword. Two stars rather close together, just north of the Pleiades, form one of his feet. Pegasus is also in the sky and the "great square" is shown on the map. Even the monster is there as well. Towards the southwest you can see a quadrilateral of stars, with a somewhat brighter one just below the westernmost of the four. The latter is Deneb Kaitos, the tail of Cetus, the whale. The head of the beast lies just about half way between the four stars and Aldebaran, in the eye of Taurus.

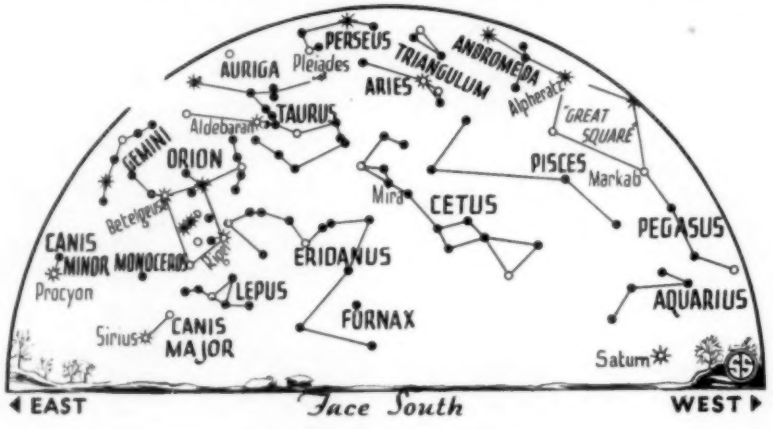
Not Portraits

You needn't, by the way, be surprised if you cannot see any resemblance between the stars as arranged in the skies, and the objects they are supposed to represent. Most constellations would represent almost anything better than the objects after which they are named. One should think of them as areas dedicated to these mythical characters, rather than as accurate pictures of the characters themselves.

There is an important change in the motion of the sun during this month. Since last June it has been moving southwards in the sky, but on Dec. 22 at 7:50 a. m., eastern standard time, it reaches its farthest south, and then starts northwards. This is the winter solstice, and is the moment at which winter commences. Also, it makes the shortest day of the year, and the longest night.

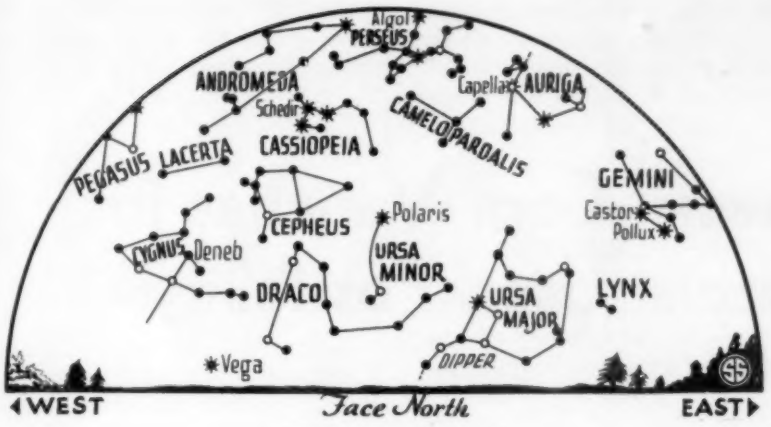
The glorious winter constellations are now coming into view. Low in the east can be seen the most brilliant of all,

• SYMBOLS FOR STARS IN ORDER OF BRIGHTNESS



FAIR LADY AND HERO

In the northern skies you may now see Andromeda, fair princess chained to the rock, and her hero Perseus, to say nothing of her vain mother, Cassiopeia.



FISH AND WHALE

Represented by Pisces and Cetus, these two creatures join with Taurus, the bull, Pegasus, the horse, Canis Major and Canis Minor, the big and little dogs, and Aries, the ram, in making the southern skies a sort of heavenly zoological garden.

Orion, mighty warrior of the sky. As you see him this evening, he is on his back. The three stars of his belt are vertical; to the right is Rigel, in one of his legs, to the left can be seen Betelgeuse, in one shoulder. Above him is ruddy Aldebaran, the eye of Taurus, the bull, which is charging on the hunter. Directly above Aldebaran, in the bull's shoulders, appear the Pleiades, a little cluster of six faint stars, which are famous in song and story.

Heavenly Twins

As high as Orion, to the northeast, is the constellation of Gemini, the twins, with Castor above, and Pollux, the brighter, below. Directly above them is Auriga, the charioteer, with Capella as the brightest star. All of these are shown on the accompanying maps, which picture the December skies as seen at 10 p. m. on the first of the month, 9 p. m. on the fifteenth and 8 p. m. on the thirty-first. Two other bright winter stars appear nearer the eastern horizon. One is Sirius, the dog star, in Canis Major, the greater dog, which is just below Orion when it rises. This is the most brilliant star in the sky, so it is easy to find. Incidentally, it is also the nearest star that can be seen from the United States with the unaided eye. Its light reaches the earth in the astronomically short time of nine years, though travelling every second a distance equal to seven times the circumference of the earth.

The maps show other conspicuous star groups which have been with us in the evening for the last few months.

Low in the southwest can be seen Saturn, not a star at all, but one of the planets, including the earth, that encircle the sun. Its steady brilliance is very different from the twinkling stars, and can readily be located.

High in the western sky, resting on one corner, is the Great Square of Pegasus. This is really a misnomer, because one of the stars, Alpheratz, the topmost as now seen, is not in Pegasus at all but in the neighboring constellation of Andromeda. Just north of this group in the inverted W-shaped figure of Cassiopeia, the queen, seated on her throne. Quite low, (too low to show on the maps) and directly west, is Altair, marking the eagle, Aquila, while farther north is Vega, in Lyra, the lyre. Between them and a little higher, standing erect, is the northern cross, or Cygnus, the swan. At the top of the cross is Deneb, the swan's tail. Albireo marks the foot of the cross, or the beak of the swan.

Christmas Moonlight

During December, the moon can be seen in the evening sky from about the tenth, when it will be a well developed crescent in the west, until about the 24th, when it will rise between eight and nine o'clock, in a gibbous phase, a few days past full. On December 9 at 3:00 a. m. eastern standard time, the moon will be at its closest for the month, 226,620 miles from the earth; on the 25th, at 5:00 a. m., eastern standard time, it will be at its farthest. Then 251,920 miles will separate us from our satellite. The new moon is on December 6 at 12:25 p. m., E.S.T.; it is at First Quarter on December 13 at 5:52 a. m.; Full on December 20 at 3:53 p. m.; and at Last Quarter on December 28 at 9:08 p. m.

Science News Letter, November 24, 1934

ENTOMOLOGY

Stinging Bees Do Not Always Die

THE widely held belief that the bee can only sting once, and must die afterwards, is denied by Dr. J. G. Myers of the Imperial College of Tropical Agriculture, Trinidad. Dr. Myers carried out experiments with bees under various conditions, inducing them to sting handkerchiefs, insects, and frogs. Even after stinging several times, the bee usually recovered. (*See SNL, June 2, p.* 350)

Dr. Myers' zeal was not sufficiently great to withstand the bee's sting, for he remarks: (*Nature, Aug.* 25) "I was stung on the thumb and, perhaps because it was unexpected and I acted more violently than our other subjects, the sting was left in the wound."

Science News Letter, November 24, 1934

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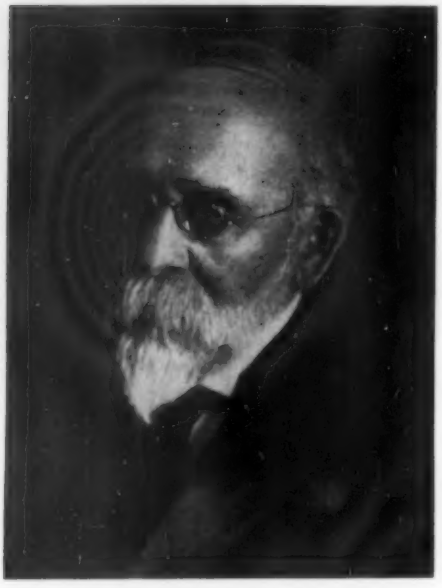


PROF. CHARLES EDWIN BESSEY

BIOGRAPHY

Science Meeting Honors Memory of Pioneer Botanist

HONORING the work of a pioneer in American botanical science and to evaluate present efforts in that field, scientific and agricultural leaders, among them Secretary of Agriculture Henry Wallace, attended a two-day meeting at Iowa State College on Nov. 15 and 16.

Sixty years ago the late Prof. Charles Edwin Bessey developed his botanical Laboratory at Ames which became a focus of modern teaching and research in the plant sciences. He pioneered botanical science in the West, carrying into the then raw territory beyond the Mississippi the intellectual ferment and the new and critical methods of research developed in Europe by such famous figures as Pasteur and Darwin, and in the eastern United States by the great botanist Asa Gray. A tangible monument of Bessey's methods and equipment was shown at the meeting: it is his compound microscope, specially built at the then astounding cost of $1,200, and used in the instruction of many college generations of students. This instrument is now one of the most cherished historical treasures of Iowa State College.

A prominent part in the discussion of modern methods in the propagation of knowledge about plants was taken by Prof. Bessey's own son, Dr. Ernst A. Bessey, who is also a professor of botany, at Michigan State College. Other speakers on the program included Prof. I. E. Melhus, who now occupies Prof. Bessey's chair at Iowa State College, and Prof. R. J. Pool of the University of Nebraska, whither Prof. Bessey went after he had founded his pioneer laboratory at Ames.

Science News Letter, November 24, 1934

AGRICULTURE

Special Corn Varieties for Special Uses, Possibility

CORN will not be "just corn" to future generations of farmers. Scientific breeding may be expected to produce special kinds for each different purpose, Secretary of Agriculture Henry A. Wallace suggested at the conclusion of an address before a national audience of scientists, gathered at Iowa State College to commemorate the founding of the pioneer laboratory in modern plant science sixty years ago, by the late Prof. Charles Edwin Bessey. In his address Secretary Wallace reviewed the history of corn breeding during the same six decades, and concluded with a look into the possible future.

He outlined some of the things that might be undertaken:

"We shall need experiments to discover whether or not it is desirable to have softer textured strains of corn in order to promote greater ease of mastication by hogs, or whether such problematical advantage in softness may be offset by lower protein content and by susceptibility to disease and lower yields. Is there any advantage in increasing or decreasing the oil content in corn from the standpoint of the maximum utilization by livestock?

"Perhaps the time is now approaching when the corn breeders should cooperate more and more with those who are concerned chiefly with the use of corn. Possibly we shall come eventually to think of one type of corn as hog corn to be fed on the ear, another type as cattle corn to be fed ground, and still another type as commercial corn especially adapted for human cornmeal, or starch corn for the wet process of corn manufacture."

The history of corn breeding, as outlined by Secretary Wallace, is divisible into four periods. Before 1896, corn breeding was chiefly in the hands of practical farmers. From 1896 until 1910, colleges and experiment stations assumed the leadership, especially by means of "corn shows."

From 1910 to 1920 a more scientific attitude marked the efforts of corn breeders, though even then the modern principles of genetics, discovered by Gregor Mendel, were not brought into effective use.

From 1920 on, corn breeders have been employing mendelian principles. This work was pioneered as early as the period 1905-1910, by Drs. G. H. Shull and E. M. East. The practical application of their results, however, was carried out by other men, prominent among whom has been Henry Wallace himself—though he omitted any mention of that fact in his address.

Secretary Wallace's feeling toward corn goes beyond the emotionless objectivity of the laboratory. He said:

"Those who have worked with corn and studied it in all its intimate details for many years realize that corn is not merely corn. It is a composite of many things and can be molded in many directions. The possibilities with corn are almost as infinite as with humanity itself . . . The future is limitless as long as our desires are keen and our minds open."

Science News Letter, November 24, 1934

ZOOLOGY

Beavers Disable Lighting Plant in Yellowstone Park

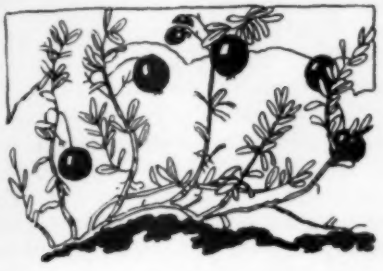
YELLOWSTONE Park's hydroelectric plant, which supplies the headquarters settlement at Mammoth Hot Springs with electricity, recently developed "beaver trouble." Its water supply failed, and the plant had to shut down.

Trouble-shooters hot-footed it out along the intake pipe line. At its upper end they found a new beaver dam, built right on top of the protecting grating.

Science News Letter, November 24, 1934

HORTICULTURE

NATURE RAMBLINGS *by Frank Thone*



Cranberries

THE approach of Thanksgiving keeps cranberries well to the fore in all the shops and market stalls. These bright berries, attractive to the eye before they are cooked and even more attractive to the palate afterwards, maintain their popularity with generation after generation of Americans, and even a stiffly rising price scale does not prevent ever-increasing consumption.

Cranberries are as American as the noble bird they supplement and garnish. Our European forebears knew them not, but learned to appreciate them under the tutelage of the Indians. Used as they were to having gooseberry sauce with the Christmas goose, they very quickly found that cranberry sauce with the native American turkey was if anything an improvement on their traditional Old-World *pièce de résistance*. And turkey with cranberry sauce we have had ever since.

Until the present generation, cranberries were largely a gift of Nature. The cranberry pickers went out into the bogs in the low-lying coastal country and gathered the berries from the wild bushes wherever they could find them. But with an increasing population and a climbing demand for the berries, it became worth while to cultivate them, and bog-land became berry-farm land.

A cranberry farm is one of the most anomalous plantations in the world. Elsewhere flooding of a crop spells disaster, but here it is often done deliberately. Cranberries are not flooded for the purpose of irrigation, as in the semi-arid West. They are covered with water to keep them warm. Freezing is fatal to ripe cranberries, as any storekeeper or housekeeper can tell you. So when frost threatens at the time of harvest, the cranberry farmers simply open the floodgates and shield their crop under a blanket of water until the danger is past.

Science News Letter, November 24, 1934

METEOROLOGY

Stratosphere Balloons Will Go Up to Study Storms

STRATOSPHERE-seeking balloons, going up to study atmospheric conditions 15 miles above the earth, will court stormy weather instead of avoiding it, when the second mass flight launched by the Massachusetts Institute of Technology takes off from Lambert Field airport at St. Louis, Mo., in the near future. They will wait for word of an approaching storm area, and then hop off.

It is expected that every balloon in the flight will be wrecked; indeed it is even arranged that they shall burst. But there will be no human casualties. The 35 big gas bubbles in rubber will all be pilotless. They will carry only featherweight meteorographs, which are instruments that automatically record temperature, humidity and air pressure.

When released, the balloons will not be fully inflated, to allow for expansion as they mount toward the 15-mile altitude they are designed to attain. Finally, when the thin rubber can stretch no farther, the balloons will burst. The meteorographs will then float downward on parachutes, and the slight shock of their landing will be broken by the light cages of split bamboo in which they are enclosed.

Prof. C. G. A. Rossby, of M. I. T. states that of the 38 meteorographs sent aloft on the first mass flight last February, all but two were safely returned, their valuable records intact.

Science News Letter, November 24, 1934

MEMORANDUM ABOUT CHRISTMAS:

What a friendly thing it is to say "MERRY CHRISTMAS."

We all say it in many ways--with gifts of as many kinds as there are personalities to be given to, as well as to give.

Some of you who will read this note used one or several subscriptions to Science News Letter last year, to remember friends and relatives.

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Watson Davis

WD/TR Editor.

P. S. If you would like us to send you a Red and Silver Parchment Christmas Greeting folder to pass along to announce your gift, please make a notation to that effect on the order form.

First Glances at New Books

Zoology

FROM JUNGLE TO ZOO—Lucile Q. Mann—*Dodd, Mead,* 246 p., $2. Lucile Mann is the wife of Bill Mann, who is the director of the National Zoological Park in Washington. He numbers among his friends circus advance agents, animal trainers, clowns, explorers, scientists, "natives" of all colors on all continents, German animal dealers, Arab animal dealers, orang-utans, rhinoceroses, porcupines, and large snakes. He is apt to turn up for dinner with one or more of these in tow at any time; so that his helpmeet's life is anything but dull. But she meets all situations with an adaptability that would shame a diplomat's wife. In her book she carries us with her, in her interest and zest for strange guests, and equally for the strange hosts by whom she has in her turn been entertained when she accompanied her husband on his journeys into out-of-the-way ends of the earth.

Science News Letter, November 24, 1934

Agricultural Economics

COTTON UNDER THE AGRICULTURAL ADJUSTMENT ACT—Henry I. Richards—*Brookings Institution,* 129 p., 50c. A dispassionately factual examination of the cotton-crop limitation methods used for the abatement of the accumulated surplus, and the results of the program.

Science News Letter, November 24, 1934

Economics

SOCIAL INSURANCE AND ECONOMIC SECURITY—Edward H. Ochsner—*Bruce Humphries,* 289 p., $2.50. The publisher says that this volume, written by a physician and consultant surgeon to the Augustana Hospital, Chicago, "raises the question whether it is wise or just for any government to take the fruits of labor from the industrious, frugal and thrifty citizens and give them, without their consent, to the lazy, shiftless, and immoral. It makes the claim and furnishes the proof that social insurance has an inevitable tendency to do this very thing and hence that it does not favor justice and fair dealing among men."

Science News Letter, November 24, 1934

Photography

THE SECRET OF EXPOSURE—Frank R. Fraprie—*American Photographic Publishing Co.,* 96 p., 50c. Of interest to those practising photography.

Science News Letter, November 24, 1934

Geography

GUIDE TO ADIRONDACK TRAILS, NORTHEASTERN SECTION—*Adirondack Mountain Club,* 116 p., maps, 75c.

Science News Letter, November 24, 1934

Ornithology

BIRD CITY—E. A. McIlhenny—*Christopher Pub. House,* 203 p., $3. Written in narrative style, this book sets forth in intimate detail the life of a bird metropolis on a Gulf Coast island, as seen through the eyes of the author and his two grandsons. There are, of course, many photographic illustrations, some of them of really high quality.

Science News Letter, November 24, 1934

Anthropology

THE PAWNEE GHOST DANCE HAND GAME, A STUDY OF CULTURAL CHANGE—Alexander Lesser—*Columbia Univ. Press,* 338 p., $4. An elaborate scientific study of an old guessing game which has gone along with Pawnee history, changing with the times, having its revivals, adapting to social needs.

Science News Letter, November 24, 1934

Petroleum

THE SIGNIFICANCE OF TESTS OF PETROLEUM PRODUCTS—Committee on Petroleum Products and Lubricants—*American Society for Testing Materials,* 76 p., $1.00.

Science News Letter, November 24, 1934

Economics

INDUSTRY'S COMING OF AGE (2d printing)—Rexford Guy Tugwell—*Columbia Univ.,* 274 p., $2. The present Under Secretary of Agriculture's consideration of the technological history of industry, written in 1927.

Science News Letter, November 24, 1934

Botany

WILD FLOWERS—Homer D. House—*Macmillan,* 264 full-color illustrations with descriptive text, $7.50. Rarely does even a popular botany book deserve such fulsome adjectives as "gorgeous" or "sumptuous"; but this one rates them easily. The plates are reproduced from natural-color photographs, with a resulting fidelity in form and hue that will delight the amateur and gratify the professional botanist. The text consists of concise botanical descriptions of the plants, with habitat and distributional notes.

Science News Letter, November 24, 1934

Adult Education

A STUDY OF THE NEEDS OF ADULTS FOR FURTHER TRAINING—M. R. Trabue and Beatrice J. Dvorak—*University of Minnesota,* 149 p., 50c. Just about half of a group of adults not occupationally adjusted were diagnosed as being in need of further vocational training or retraining along new lines. The importance of the right training is emphasized in this report, which is one of the bulletins of the Employment Stabilization Research Institute.

Science News Letter, November 24, 1934

Child Care

THE MOTHER'S ENCYCLOPEDIA—Comp. by the Editors of the *Parents' Magazine—Reynal & Hitchcock,* 959 p., $3. Articles which have previously appeared in *Parents' Magazine,* gathered into a single volume of convenient size and arranged in encyclopedia fashion so that it is easy to look up any of a wide range of topics from "Adolescent Boys," to "Whooping Cough."

Science News Letter, November 24, 1934

Anatomy—Biology

THE WISTAR INSTITUTE BIBLIOGRAPHIC SERVICE, VOL. 7—Ed. and rev. by Helen Dean King—*Wistar Institute of Anatomy and Biology,* 377 p., $5.

Science News Letter, November 24, 1934

Vocations

CHOOSING A CAREER—George Bijur, ed.—*Farrar and Rinehart,* 274 p., $1.75. Whether you are faced with the decision of a future vocation or not, you will find in this group of discussions by prominent people interesting glimpses of varied fields. You can here learn, for example, what Miss Amelia

RADIO

Tuesday, November 27, 4:30 p. m.

HARNESSING SCIENTIFIC DISCOVERIES, by Dr. P. G. Agnew, Secretary of the American Standards Association.

Tuesday, December 4, 4:30 p. m.

THE FIGHT AGAINST THE TERMITES, By Dr. Charles A. Kofoid, Professor of Zoology, University of California.

In the Science Service series of radio addresses given by eminent scientists over the Columbia Broadcasting System.

Earhart and Lieut.-Commdr. Frank Hawks have to say about aviation, Roy Chapman Andrews about exploration, Miss Frances Perkins about industrial relations, Neysa McMein about commercial art and Margaret Bourke-White about commercial photography, James P. Warburg about finance, S. L. Rothafel (Roxy) about entertainment, and Miss Frances Robinson (Robbie) about secretarial work.

Science News Letter, November 24, 1934

Economic Entomology

AN ANNOTATED BIBLIOGRAPHY OF THE HESSIAN FLY, PHYTOPHAGA DESTRUCTOR (SAY)—J. S. Wade—*Govt. Print. Off.*, 100 p., 10c. All known publications on the long and dishonorable career of one of our leading grain pests are listed here; some of them date far back into the eighteenth century.

Science News Letter, November 24, 1934

Education

BIBLIOGRAPHY OF RESEARCH STUDIES IN EDUCATION, 1932-1933—Ruth A. Gray—*Govt. Print. Off.*, 349 p., 28c. (U. S. Office of Education Bulletin, 1934, no. 7).

Science News Letter, November 24, 1934

Education

TEACHERS' PROBLEMS WITH EXCEPTIONAL CHILDREN—III: MENTALLY RETARDED CHILDREN—Elise H. Martens—*Govt. Print. Off.*, 42 p., 5c. U. S. Office of Education Pamphlet no. 49.

Science News Letter, November 24, 1934

Biology

OBJECTIVE UNIT TESTS ON EVERYDAY PROBLEMS IN BIOLOGY—C. J. Pieper, W. L. Beauchamp and O. D. Frank—*Scott, Foresman*, 48 p., 28c.

Science News Letter, November 24, 1934

General Science

OBJECTIVE UNIT TESTS ON EVERYDAY PROBLEMS IN SCIENCE—C. J. Pieper and W. L. Beauchamp—*Scott, Foresman*, 68 p., 28c.

Science News Letter, November 24, 1934

Photography

REMARKABLE LIGHTNING PHOTOGRAPHS—C. G. Abbot—*Smithsonian Institution*, 3 p., 5c. A reproduction with explanation of two extraordinary photographs taken by Alexander Larsen of Chicago.

Science News Letter, November 24, 1934

Geology

A LABORATORY MANUAL OF PHYSICAL AND HISTORICAL GEOLOGY—Kirtley F. Mather and Chalmer J. Roy—*Appleton-Century*, 302 p., map. $2.50.

Science News Letter, November 24, 1934

Geology

REPORT OF THE COMMITTEE ON GEOLOGIC TIME—Alfred C. Lane, chairman—*National Research Council*, 86 p., free. A summary of the latest work by geologists and geophysicists all over the world who are endeavoring to obtain a more accurate estimate of the absolute ages of geologic formations, particularly by the use of the various radioactive "clocks of the rocks" that have been proposed. This report should be consulted by every one in any way interested in historical geology, for it makes obsolete, in part or in whole, every geologic time table now in print.

Science News Letter, November 24, 1934

Engineering

A. S. T. M. STANDARDS ON ELECTRICAL INSULATING MATERIALS—*American Society for Testing Materials*, 281 p,, $1.75.

Science News Letter, November 24, 1934

Botany

L'EMBRYOLOGIE VÉGÉTALE — RESUMÉ HISTORIQUE—René Souèges—*Hermann et Cie.*, 57 p., 12 fr.

Science News Letter, November 24, 1934

Plant Chemistry

LES CAROTÉNOIDES DES PLANTES—Edgar Lederer—*Hermann et Cie.*, 82 p., 18 fr.

Science News Letter, November 24, 1934

Botany

LA MULTIPLICATION VÉGÉTATIVE—Pierre Chouard—*Hermann et Cie.*, 10 fr.

Science News Letter, November 24, 1934

Hygiene

THE NEW HANDBOOK OF HEALTH—Woods Hutchinson—*Houghton Mifflin*, 432 p., 96c. A textbook of physiology and hygiene for elementary pupils. The figures showing the composition of various common foodstuffs are particularly interesting.

Science News Letter, November 24, 1934

Archaeology

THE EXCAVATIONS AT DURA-EUROPOS . . . PRELIMINARY REPORT OF FIFTH SEASON OF WORK, OCTOBER, 1931-MARCH, 1932—Ed. by M. I. Rostovtzeff—*Yale Univ.*, 322 p., 52 plates, $5. An important year in the excavation of Dura is added to the growing shelf of volumes on this remarkable site. Discoveries described in this report include fortifications, military archives, shops and dwellings, two temples, and the now famous chapel with its revelations of Christian art in the first part of the third century. Several of these early Bible paintings are reproduced in color.

Science News Letter, November 24, 1934

Juvenile Science

SCIENCE AT HOME—Edith M. Patch and Harrison E. Howe—*Macmillan*, 450 p., 92c. A simply but intelligently written book for younger readers, which will show them vividly what a wonderfully interesting place home is, and also introduce them to the equally interesting, even though somewhat strange, homes that other children live in. It also gives them convincing but painless "why nots" for a number of necessary "do nots," and to counterbalance, a large number of fascinating and profitable things which they may do.

Science News Letter, November 24, 1934

Radio

RADIO AS A CULTURAL AGENCY—Edited by Tracy F. Tyler—*National Committee on Education by Radio*, 150 p., free. The text of addresses delivered at a conference of the National Committee on Education by Radio, together with reports of discussion and group and committee reports.

Science News Letter, November 24, 1934

Natural History

DO YOU KNOW?—Janet Smalley—*William Morrow*, 44 p., $1.25. Bright, poster-like illustrations of the life activities of a number of insects, with brief text for very young readers.

Science News Letter, November 24, 1934

Botany

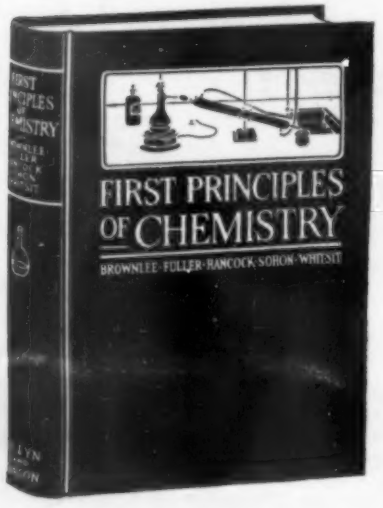
MANUAL OF THE TREES OF NORTH AMERICA—Charles Sprague Sargent—*Houghton Mifflin*, 910 p., $5. Botanists everywhere will welcome this new edition of Sargent's classic work, in manageable one-volume form and at a manageable price. Its appearance is especially timely, in view of the great expansion in the study and practice of forestry which seems to be in immediate prospect in this country.

Science News Letter, November 24, 1934

Science News Letter will secure for its subscribers any book or magazine in print which was published in the United States. Send check or money order to cover regular retail price ($5 if price is unknown, change to be remitted) and we will pay postage in the U. S. When publications are free, send 10c. for handling. Address Book Dept., Science News Letter, 21st and Constitution Ave., Washington, D. C.

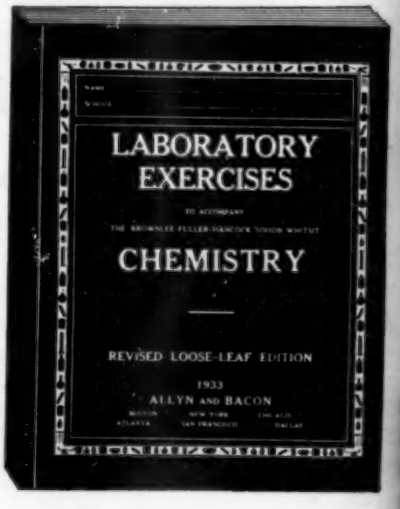
THE WORLD OF CHEMISTRY

WE LIVE our lives amid material things. To the understanding of this environment man has given centuries of toil and thought. Slowly superstitions have given way to scientific facts. Great minds have delved in obscurity to bring forth scientific principles. When these were numerous enough and became properly classified, the sciences of today came into being.



The pathways to the sciences were not dull and humdrum, for along the road lay adventure, romance, and even tragedy. Ever the scientist sought the truth. Always he regarded his labors as vain unless he gave a better understanding of the world about him and turned his discoveries to the service of mankind.

Chemistry offers a rich field to the inquiring mind and brings great reward to those who understand its teachings. It is of constant practical value. It tells how to select proper materials for every kind of construction. It has rendered available many metals and special alloys that make our trains, automobiles, and airplanes more serviceable. It has made the soil more fertile and has revealed the nature of our food. It shows us that the human body is a living chemical laboratory, and that even thought has a chemical basis.



The modern textbook in chemistry reflects its history, spirit and service to mankind. It is not a mere epitome of facts—scientific principles serve as luminous guides along the course the learner must take. Vivid illustrations and simple language make clear the practical applications of science. There is careful selection of valuable topics properly grouped. There are devices for testing the learning of the student in accord with modern educational practice.

Tested laboratory exercises supplement the ideal textbook and guide the student in his first-hand study of chemical phenomena. They make him appreciate the vividness of chemical reactions and train him to draw only those conclusions justified by the observed facts.

Best of all, the study of chemistry in this modern manner trains the mind in straight, honest thinking—the true preparation for facing the realities of the present day.

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